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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,230	09/18/2003	Byong-Ho Park	S02-093	7005

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Marek Alboszta  
LUMEN  
2345 Yale Street  
2nd Floor  
Palo Alto, CA 94306

EXAMINER

KASZTEJNA, MATTHEW JOHN

ART UNIT	PAPER NUMBER
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3739

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/667,230

Applicant(s)

PARK ET AL

Examiner

Matthew J. Kasztejna

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/18/03 & 4/16/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to because of insufficient quality – Figs. 4, 5a-b and 9. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claims 12-13 and 15-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recited method claims are dependent from an apparatus claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-11, 14, 18, 21-38 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,110,121 to Lenker.

**In regards to claims 1, 18, 26, 29 and 37**, Lenker discloses an ultrasonic imaging system useful for intravascular ultrasound forward imaging applications, the ultrasonic imaging system comprising: a compliant apparatus having no mechanical joints and capable of being manipulated in various motions and degree-of-freedom without permanent deformation (see Fig. 3), the compliant apparatus comprising: a tubular structure 102 formed from a tube made of a material having a reversible structural behavior; and at least one compliant mechanism integrally formed from the tube (see Fig. 4); an ultrasound transducer 104 coupled to the compliant apparatus; and at least one actuator 42 attached to the compliant apparatus for manipulating the

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compliant apparatus and the at least one compliant mechanism (see Col. 4, Lines 40-67).

**In regards to claim 2**, Lenker discloses a compliant apparatus, wherein the cross-section of the tube is characterized as circular, oval, rectangular, square, straight, curvy, angular, or irregular (see Fig. 3).

**In regards to claim 5**, Lenker discloses a compliant apparatus, wherein the compliant mechanism inherently stores strain energy and utilizes the stored energy as a bias force for shape recovery (see Fig. 3).

**In regards to claim 6**, Lenker discloses a compliant apparatus, wherein the compliant mechanism is capable of being actuated by at least one actuators 42 (see Col. 4, Lines 40-49).

**In regards to claims 7-8, 21, 27, 30**, Lenker discloses a compliant apparatus, wherein the at least one actuators are made of Shape Memory Alloys (SMAs) and wherein the SMAs are based on shape memory effects including contraction, rotation, and a combination thereof (see Col. 4, Lines 50-60).

**In regards to claims 9, 22**, Lenker discloses a compliant apparatus, wherein the at least one actuators are characterized as piezoelectric or electro-active polymer actuators (se Col. 5, Lines 7-18).

**In regards to claims 10-11, 23, 28, 31**, Lenker discloses a compliant apparatus, wherein the at least one actuators are characterized as wires connected to an external apparatus and actuated remotely via the external apparatus 30 (see Col. 5, Lines 31-46).

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**In regards to claim 14**, Lenker discloses a compliant apparatus, further comprising at least one built-in micro structure selected from the group consisting of a welding-enabling structure and a clamping-enabling structure (see Figs. 4-5).

**In regards to claims 24-25, 32-36**, Lenker discloses an ultrasonic imaging system further comprising: two additional actuators configured to actuate the compliant apparatus in an orthogonal direction, enabling the compliant apparatus to provide the ultrasound transducer with full three dimensional scanning motions (see Col. 5, Lines 7-57).

**In regards to claims 38**, Lenker discloses a system, further comprising a cooling system coupled to the micromanipulator for regulating the temperature thereof (see Col. 5, Lines 32-46).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4 and 19-20 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,110,121 to Lenker in view of U.S. Patent No. 6,500,147 to Omaleki et al.

**In regards to claims 3-4, 19-20**, Lenker discloses a compliant apparatus but is silent with respect to the reversible structure behavior characterized as elastic or superelastic and being made of a material from the group consisting of an elastic alloy

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including stainless steel and titanium alloy, and a superelastic alloy including nitinol, Cu-Al-Ni, Cu-Al, Cu-Zn-Al, Ti-V and Ti-Nb alloy. Omaleki et al. teach of an analogous flexible catheter having a tubular body 112 having sufficient structural integrity from an alloy of titanium and nickel (see Col. 6, Lines 12-44). It would have been obvious to one skilled in the art at the time the invention was made to form the tubular body in the apparatus of Lenker from an elastic material such as nitinol to provide a tubular structure with an improved combination of flexibility and kink resistance as taught by Omaleki et al. and is well known in the art.

Claim 39 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent No. 6,110,121 to Lenker in view of U.S. Patent No. 5,482,029 to Sekiguchi et al.

**In regards to claim 39**, Lenker discloses a compliant apparatus but is silent with respect to wherein the cooling system comprises a pumping means and biocompatible cooling fluid; and wherein the pumping means provides a constant flow of the cooling fluid to the micromanipulator to prevent the at least one actuators from overheating. Sekiguchi et al. teach of an analogous system having a method of flowing cooling water through the tubes (see Col. 13, Lines 13-60). It would have been obvious to one skilled in the art at the time the invention was made to include a cooling system in the apparatus of Lenker having a biocompatible cooling fluid to prevent overheating of the actuators as taught by Sekiguchi et al.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Kasztejna whose telephone number is (571) 272-6086. The examiner can normally be reached on Mon-Fri, 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda C.M. Dvorak can be reached on (571) 272-4764. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJK

*rvf*

7/19/05

*Beverly M. Flanagan*  
BEVERLY M. FLANAGAN  
PRIMARY EXAMINER